

local IP address; and

modifying said source IP address of said datagram to be said external IP address of said gateway,
binding said destination port address to said local IP address of said local device and creating an
association between said destination port address and the external IP address of said external device,
and passing said datagram to said external network for routing and delivery to said external device
if said destination port address is not bound to said local IP address of said local device.

REMARKS

The abstract has been amended to add drawing reference numbers.

Claim 1 has been rewritten to eliminate from claim 1 some claim elements that have now been rewritten as claims depending from claim 1. As such, the original content of claim 1 is now found in claims 1 - 4. Original dependent claims 2, 3 and 4 have been rewritten without modification as claims 5, 6 and 7. Original independent claim 5 has been rewritten as independent claim 8, and has eliminated some claim elements that have now been rewritten as dependent claim 9. Original independent claim 6 has been rewritten as independent claim 10, and some claim elements have been eliminated and rewritten as dependent claim 11. Original dependent claim 7 has been rewritten without modification as dependent claim 12, and original dependent claims 8 - 12 have been rewritten without modification as new dependent claims 13 - 17. New independent claim 18 has been added.

No new matter has been added to the application.

Because the total number of original and added claims is less than 20, applicant believes that

no additional fees are due as a result of this Preliminary Amendment.

Respectfully submitted,

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PATENTS

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: NEXLAND, INC.

Serial No.: 09/518,399

Group Art Unit: 2739

Filed: March 3, 2000

For: Network Address Translation Gateway for Local Area Networks Using Local IP Addresses and Non-Translatable Port Addresses

EXTRA SHEETS CONTAINING MARKED-UP AMENDED CLAIMS

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MARKED-UP AMENDED CLAIMS

1. A network address translating gateway connecting a LAN to an external network, said LAN using local IP addresses, said gateway having a local IP address that can be seen by devices on said LAN and having an external IP address that can be seen by devices on said external network, said gateway comprising

 a plurality of internal tables associating combinations of local IP addresses of local devices on said LAN, external IP addresses of external devices on said external network, SPI - In values, SPI - Out values, source port addresses, destination port addresses, reserved port addresses, and maintaining a list of reserved port addresses,

 means for performing normal address translation upon datagrams passing from said LAN to said external network and datagrams passing from said external network to said LAN,

 means for delivering a datagram from a local device on said LAN to an external device on said external network by receiving a datagram from a local device on said LAN intended for delivery to an external device on said external network, and [determining whether said datagram is encrypted and, if said datagram is encrypted, for determining whether the SPI of said datagram is recorded in the SPI - Out field in said internal table and, if said SPI is recorded in said SPI - Out field, modifying the source IP address of said datagram to be said external IP address of said gateway and passing said datagram to said external network for routing and delivery to said external device,

 and if said SPI is not recorded in said SPI - Out field of said internal table, setting the SPI - In field corresponding to the local IP address of said local device equal to zero and setting said SPI - Out field equal to said SPI, modifying said source IP address of said

datagram to be said external IP address of said gateway and passing said datagram to said external network for routing and delivery to said external device,

and if said datagram is not encrypted,] determining whether the destination port address for said datagram is included in said list of reserved port addresses and, if said destination port address is not included in said list of reserved port addresses, performing normal address translation upon said datagram and passing said datagram to said external network for routing and delivery to said external device,

and if said destination port address is included in said list of reserved port addresses, determining whether said destination port address is bound to said local IP address of said local device, and if said destination port address is bound to said local IP address, performing normal address translation upon said datagram and passing said datagram to said external network for routing and delivery to said external device,

and if said destination port address is not bound to said local IP address of said local device, modifying said source IP address of said datagram to be said external IP address of said gateway, binding said destination port address to said local IP address of said local device and creating an association between said destination port address and the external IP address of said external device, and passing said datagram to said external network for routing and delivery to said external device[,

means for delivering a datagram from said external device to said local device by receiving a datagram from said external device on said external network intended for delivery to said local device on said LAN,

determining whether said datagram is encrypted and, if said datagram is encrypted, determining whether the datagram's SPI is recorded in said SPI - In field of said internal

table and, if said SPI is recorded in said SPI - In field, modifying the destination IP address of said datagram to be said local IP address of said local device and passing said datagram to said LAN for routing and delivery to said local device,

and if said SPI is not recorded in said SPI - In field of said internal table, determining whether said SPI - In field corresponding to said IP address of said external device is equal to zero and, if said SPI - In field is not equal to zero, discarding said datagram,

and if said SPI - In field is equal to zero, setting said SPI - In field equal to said SPI, modifying the destination IP address of said datagram to be said local IP address of said local device and passing said datagram to said LAN for delivery to said local device,

and if said datagram is not encrypted, determining whether the destination port address for said datagram is included in said list of reserved port addresses and, if said destination port address is not included in said list of reserved port addresses, performing normal address translation upon said datagram and passing said datagram to said LAN for delivery to said local device,

and if said destination port address is included in said list of reserved port addresses, determining whether said destination port address is bound to the local IP address of said local device, if said destination port address is not bound to said local IP address, discarding said datagram,

and if said destination port address is bound to said local IP address, modifying said destination IP address of said datagram to be said local IP address of said local device, unbinding said destination port address from said local IP address, and passing said datagram to said LAN for delivery to said local device].

2. (Amended) [The network address translating gateway of claim 1, further

comprising a timer, wherein, upon receiving a signal that a port address has become bound to an IP address, said timer will commence timing for a predetermined length of time and, upon the expiration of said predetermined length of time, will send a signal causing said port address to become unbound from said IP address, and, upon receiving a signal indicating that said port address has become unbound from said IP address prior to the expiration of said predetermined length of time, said timer will stop timing and will reset]

The network address translating gateway of claim 1, wherein the means for delivering a datagram from a local device on said LAN to an external device further comprises a means for determining whether said datagram is encrypted and, if said datagram is encrypted, for determining whether the SPI of said datagram is recorded in the SPI - Out field in said internal table and, if said SPI is recorded in said SPI - Out field, modifying the source IP address of said datagram to be said external IP address of said gateway and passing said datagram to said external network for routing and delivery to said external device.

3. (Amended) [The network address translating gateway of claim 1 in which said external network is the internet] The network address translating gateway of claim 2, further comprising if said SPI is not recorded in said SPI - Out field of said internal table, means for setting the SPI - In field corresponding to the local IP address of said local device equal to zero and setting said SPI - Out field equal to said SPI, modifying said source IP address of said datagram to be said external IP address of said gateway and passing said datagram to said external network for routing and delivery to said external device.

4. (Amended) [The network address translating gateway of claim 3 in which said LAN is a virtual private network] The network address translating gateway of claim

1, wherein the network address translating gateway further comprises means for delivering a datagram from said external device to said local device by receiving a datagram from said external device on said external network intended for delivery to said local device on said LAN, means for determining whether said datagram is encrypted and, if said datagram is encrypted, determining whether said datagram's SPI is recorded in said SPI - In field of said internal table and, if said SPI is recorded in said SPI - In field, modifying the destination IP address of said datagram to be said local IP address of said local device and passing said datagram to said LAN for routing and delivery to said local device, and if said SPI is not recorded in said SPI - In field of said internal table, determining whether said SPI - In field corresponding to said IP address of said external device is equal to zero and, if said SPI - In field is not equal to zero, discarding said datagram, and if said SPI - In field is equal to zero, setting said SPI - In field equal to said SPI, modifying said destination IP address of said datagram to be said local IP address of said local device and passing said datagram to said LAN for delivery to said local device, and if said datagram is not encrypted, determining whether the destination port address for said datagram is included in said list of reserved port addresses and, if said destination port address is not included in said list of reserved port addresses, performing normal address translation upon said datagram and passing said datagram to said LAN for delivery to said local device, and if said destination port address is included in said list of reserved port addresses, determining whether said destination port address is bound to the local IP address of said local device, if said destination port address is not bound to said local IP address, discarding said datagram, and if said destination port address is bound to said local IP address, modifying said destination IP address of said datagram to be said local IP

address of said local device, unbinding said destination port address from said local IP address, and passing said datagram to said LAN for delivery to said local device.

5. (Amended) [A method of processing IP datagrams from a local device on a LAN using local IP addresses through a network translating gateway to an external device on an external network comprising the steps of

maintaining a plurality of tables associating local IP addresses of local devices on said LAN, external IP addresses of external devices on said external network, port addresses of said local devices, port addresses of said external devices, SPI - In values, SPI - Out values, and reserved port addresses, and a list of reserved port addresses, receiving a datagram from said LAN

determining whether said datagram is encrypted and, if said datagram is encrypted, determining whether the SPI in said datagram is recorded in the SPI - Out field of one of said plurality of internal tables and, if said SPI is recorded in said SPI - Out field of said internal table, modifying the source IP address to be the external IP address of said gateway and passing said datagram to said external network for routing and delivery to said external device,

and if said SPI is not recorded in said SPI - Out field of said internal table, setting said SPI - Out field corresponding to the IP address of said external device equal to said SPI and setting the SPI - In field of said internal table to zero, modifying said source IP address to be said external IP address of said gateway, and passing said datagram to said external network for routing and delivery to said external device,

and if said datagram is not encrypted, determining whether the destination port address for said datagram is included in said table of reserved port addresses and, if said

destination port address is not included in said table of reserved port addresses, performing normal address translation upon said datagram and passing said datagram to said external network for routing and delivery to said external device,

and if said destination port address is included in said table of reserved port addresses, determining whether said destination port address is bound to an IP address, and if said destination port is bound to an IP address, performing normal address translation upon said datagram and passing said datagram to said external network for routing and delivery to said external device,

and if said destination port address is not bound to an IP address, modifying said source IP address to be said external IP address for said external device, binding said destination port address to the local IP address of said local device and creating an association between said destination port address and said external IP address of said external device, and passing said datagram to said external network for routing and delivery to said external device] The network address translating gateway of claim 1, further comprising a timer, wherein, upon receiving a signal that a port address has become bound to an IP address, said timer will commence timing for a predetermined length of time and, upon the expiration of said predetermined length of time, will send a signal causing said port address to become unbound from said IP address, and, upon receiving a signal indicating that said port address has become unbound from said IP address prior to the expiration of said predetermined length of time, said timer will stop timing and will reset.

6. (Amended) [A method of processing IP datagrams from an external device on an external network through a network translating gateway to a local device on a LAN

using local IP addresses, comprising the steps of

maintaining a plurality of tables associating local IP addresses of local devices on said LAN, external IP addresses of external devices on said external network, port addresses of said local devices, port addresses of said external devices, SPI - In values, SPI - Out values, and reserved port addresses, and a list of reserved port addresses, receiving a datagram from said external network

determining whether said datagram is encrypted and, if said datagram is encrypted, determining whether the SPI in said datagram is recorded in the SPI - In field of one of said plurality of internal tables and, if said SPI is recorded in said SPI - In field of said internal table, modifying the destination IP address to be the internal IP address of said local device and passing said datagram to said LAN for routing and delivery to said local device,

and if said SPI is not recorded in said SPI - In field of said internal table, determining whether said SPI - In field corresponding to the IP address of said external device is zero, and if said SPI - In field is not zero, discarding said datagram,

and if said SPI - In field is equal to zero, modifying said SPI - In field to be said SPI, modifying said destination IP address to be said local IP address of said local device, and passing said datagram to said LAN for routing and delivery to said local device,

and if said datagram is not encrypted, determining whether the destination port address for said datagram is included in said list of reserved port addresses, and if said destination port address is not included in said list of reserved port addresses, performing normal address translation and passing said datagram to said LAN for routing and delivery to said local device,

and if said destination port address is included in said list of reserved port

addresses, determining whether said destination port address is bound to said local IP address, and if said destination port is not bound to said local IP address, discarding said datagram,

and if said destination port address is bound to said local IP address, modifying said destination IP address to be said local IP address of said local device, unbinding said destination port address from said local IP address, and passing said datagram to said LAN for routing and delivery to said local device] The network address translating gateway of claim 1 in which said external network is the internet.

7. (Amended) [The method of processing IP datagrams as claimed in claim 5, further comprising the steps of starting a timer whenever said destination port address becomes bound to said local IP address of said local device,

resetting said timer whenever said destination port address has become released, and sending a signal whenever said timer is active and a predetermined length of time has expired from the time said timer was started] The network address translating gateway of claim 6 in which said LAN is a virtual private network.

8. (Amended) [The method of processing IP datagrams as claimed in claim 6, further comprising the steps of starting a timer whenever said destination port address becomes bound to said local IP address of said local device,

resetting said timer whenever said destination port address has become released, and sending a signal whenever said timer is active and a predetermined length of time has expired from the time said timer was started] A method of processing IP datagrams from a local device on a LAN using local IP addresses through a network translating gateway to an external device on an external network comprising the steps of:

maintaining a plurality of tables associating local IP addresses of local devices on said LAN, external IP addresses of external devices on said external network, port addresses of said local devices, port addresses of said external devices, SPI - In values, SPI - Out values, and reserved port addresses, and a list of reserved port addresses, receiving a datagram from said LAN

determining whether the destination port address for said datagram is included in said table of reserved port addresses and, if said destination port address is not included in said table of reserved port addresses, performing normal address translation upon said datagram and passing said datagram to said external network for routing and delivery to said external device,

and if said destination port address is included in said table of reserved port addresses, determining whether said destination port address is bound to an IP address, and if said destination port is bound to an IP address, performing normal address translation upon said datagram and passing said datagram to said external network for routing and delivery to said external device,

and if said destination port address is not bound to an IP address, modifying said source IP address to be said external IP address for said external device, binding said destination port address to the local IP address of said local device and creating an association between said destination port address and said external IP address of said external device, and passing said datagram to said external network for routing and delivery to said external device.

9. (Amended) [The method of processing IP datagrams as claimed in claim 5, in which said external network is the internet] The method of claim 8, further comprising

the steps of:

determining whether said datagram is encrypted and, if said datagram is encrypted,
determining whether the SPI in said datagram is recorded in the SPI - Out field of one of
said plurality of internal tables and, if said SPI is recorded in said SPI - Out field of said
internal table, modifying the source IP address to be the external IP address of said
gateway and passing said datagram to said external network for routing and delivery to
said external device, and if said SPI is not recorded in said SPI - Out field of said internal
table, setting said SPI - Out field corresponding to the IP address of said external device
equal to said SPI and setting the SPI - In field of said internal table to zero, modifying said
source IP address to be said external IP address of said gateway, and passing said
datagram to said external network for routing and delivery to said external device.

10. (Amended) [The method of processing IP datagrams as claimed in claim 6, in which said external network is the internet] A method of processing IP datagrams from an external device on an external network through a network translating gateway to a local device on a LAN using local IP addresses, comprising the steps of

maintaining a plurality of tables associating local IP addresses of local devices on said LAN, external IP addresses of external devices on said external network, port addresses of said local devices, port addresses of said external devices, SPI - In values, SPI - Out values, and reserved port addresses, and a list of reserved port addresses,

receiving a datagram from said external network

determining whether said datagram is encrypted and if said datagram is not encrypted, determining whether the destination port address for said datagram is included

in said list of reserved port addresses, and if said destination port address is not included in said list of reserved port addresses, performing normal address translation and passing said datagram to said LAN for routing and delivery to said local device,

and if said destination port address is included in said list of reserved port addresses, determining whether said destination port address is bound to said local IP address, and if said destination port is not bound to said local IP address, discarding said datagram,

and if said destination port address is bound to said local IP address, modifying said destination IP address to be said local IP address of said local device, unbinding said destination port address from said local IP address, and passing said datagram to said LAN for routing and delivery to said local device.

11. (Amended) [The method of processing IP datagrams as claimed in claim 5 in which said LAN is a virtual private network] The method of claim 10, wherein the method further comprises the steps, if said datagram is encrypted, of:

determining whether the SPI in said datagram is recorded in the SPI - In field of one of said plurality of internal tables and, if said SPI is recorded in said SPI - In field of said internal table, modifying the destination IP address to be the internal IP address of said local device and passing said datagram to said LAN for routing and delivery to said local device,

and if said SPI is not recorded in said SPI - In field of said internal table, determining whether said SPI - In field corresponding to the IP address of said external device is zero, and if said SPI - In field is not zero, discarding said datagram,

and if said SPI - In field is equal to zero, modifying said SPI - In field to be said SPI,

modifying said destination IP address to be said local IP address of said local device, and
passing said datagram to said LAN for routing and delivery to said local device.

12. (Amended) [The method of processing IP datagrams as claimed in claim 6 in which said LAN is a virtual private network] The method of processing IP datagrams as claimed in claim 11, further comprising the steps of starting a timer whenever said destination port address becomes bound to said local IP address of said local device, resettling said timer whenever said destination port address has become released, and sending a signal whenever said timer is active and a predetermined length of time has expired from the time said timer was started.

13. (New) The method of processing IP datagrams as claimed in claim 12, further comprising the steps of starting a timer whenever said destination port address becomes bound to said local IP address of said local device, resettling said timer whenever said destination port address has become released, and sending a signal whenever said timer is active and a predetermined length of time has expired from the time said timer was started.

14. (New) The method of processing IP datagrams as claimed in claim 11, in which said external network is the internet.

15. (New) The method of processing IP datagrams as claimed in claim 12, in which said external network is the internet.

16. (New) The method of processing IP datagrams as claimed in claim 5-11 in which said LAN is a virtual private network.

17. (New) The method of processing IP datagrams as claimed in claim 12 in which said LAN is a virtual private network.

18. (New) A machine readable storage, having stored thereon a computer program having a plurality of code sections executable by a machine and for connecting a LAN to an external network via a network address translating gateway, wherein said gateway having a local IP address that can be seen by devices on said LAN and having an external IP address that can be seen by devices on said external network, and further including a plurality of internal tables associating combinations of local IP addresses of local devices on said LAN, external IP addresses of external devices on said external network, source port addresses, destination port addresses, reserved port addresses, and a list of reserved port addresses, for assisting the machine to perform the steps of:

attempting to deliver a datagram from a local device on said LAN to an external device on said external network by receiving a datagram from a local device on said LAN intended for delivery to an external device on said external network;

determining whether the destination port address for said datagram is included in said list of reserved port addresses and determining whether said destination port address is bound to said local IP address of said local device;

performing normal address translation upon said datagram and passing said datagram to said external network for routing and delivery to said external device if said destination port address is not included in said list of reserved port addresses;

performing normal address translation upon said datagram and passing said datagram to said external network for routing and delivery to said external device, if said destination port address is included in said list of reserved port addresses and if said destination port address is bound to said local IP address; and

modifying said source IP address of said datagram to be said external IP address

of said gateway, binding said destination port address to said local IP address of said local device and creating an association between said destination port address and the external IP address of said external device, and passing said datagram to said external network for routing and delivery to said external device if said destination port address is not bound to said local IP address of said local device.